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**ITU-R**  
Radiocommunication Sector of ITU

**Recommendation ITU-R BS.2094-0**  
(04/2016)

**Common definitions for the  
audio definition model**

**BS Series**  
**Broadcasting service (sound)**

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<b>BR</b>	Recording for production, archival and play-out; film for television
<b>BS</b>	<b>Broadcasting service (sound)</b>
<b>BT</b>	Broadcasting service (television)
<b>F</b>	Fixed service
<b>M</b>	Mobile, radiodetermination, amateur and related satellite services
<b>P</b>	Radiowave propagation
<b>RA</b>	Radio astronomy
<b>RS</b>	Remote sensing systems
<b>S</b>	Fixed-satellite service
<b>SA</b>	Space applications and meteorology
<b>SF</b>	Frequency sharing and coordination between fixed-satellite and fixed service systems
<b>SM</b>	Spectrum management
<b>SNG</b>	Satellite news gathering
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<b>V</b>	Vocabulary and related subjects

*Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.*

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## RECOMMENDATION ITU-R BS.2094-0\*

**Common definitions for the audio definition model**

(2016)

**Scope**

This Recommendation contains a set of common definitions for multichannel audio configurations that use the audio definition model (Recommendation ITU-R BS.2076) to describe them.

**Keywords**

ADM, audio, multichannel, channel-based, tracks, metadata, bw64, exchange, audio programme, BWF, immersive.

The ITU Radiocommunication Assembly,

*considering*

- a) that storage media based on information technology, including data disks and tapes, have penetrated all areas of audio production for radio broadcasting, namely non-linear editing, on-air play-out and archives;
- b) that the adoption of a single file format for signal interchange would greatly simplify the interoperation of individual pieces of equipment, and remote studios, and it would facilitate the desirable integration of editing, on-air play-out, and archiving;
- c) that compatibility with currently-available commercial file formats would minimize the industry efforts required to implement a new format in the equipment;
- d) that future audio systems will require metadata associated with the audio to be carried in the file;
- e) that future audio systems will use a variety of multichannel configurations including channel-, object-, and scene-based audio such as specified in Recommendation ITU-R BS.2051;
- f) that future audio systems will use the audio definition model (Recommendation ITU-R BS.2076) to describe the technical format of the audio being delivered and exchanged;
- g) that the majority of audio in existence and produced in the short-term future is and will be channel-based using a commonly used set of configurations;
- h) that using different metadata descriptions for identical audio configurations will cause compatibility problems and unnecessary overheads,

*recommends*

that, for exchanging any audio that uses the audio definition model (Recommendation ITU-R BS.2076) as the metadata model, a set of common definitions be used to describe any audio configurations as defined in Annex 1.

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\* Radiocommunication Study Group 6 made editorial amendments to this Recommendation in the year 2016 in accordance with Resolution ITU-R 1

## Annex 1 (Normative)

### Common definitions for the audio definition model

#### 1 Introduction

Recommendation ITU-R BS.2076, the audio definition model (ADM), is a metadata model used to describe the technical content and format of audio. It can be used to describe many types of audio signals to allow them to be rendered correctly, whether they be object-, scene-, or channel-based. While the ADM is extremely flexible and allows any type of audio format to be defined, the vast majority of audio in existence is based on a few commonly-used channel-based configurations. Therefore, it is not efficient for these commonly used formats to need to be explicitly defined every time they are used. It would also be problematic for identical formats to be defined in different ways by different organisations or applications.

To provide consistency and efficiency in the use of the ADM, a set of common definitions has been drawn up. These are based on what is commonly used in the audio industry, including those specified in Recommendations ITU-R BS.2051 and ITU-R BS.775 to produce definitions that should be used when these configurations are used in files and streams. This set of common definitions is intended to be a living resource, with new definitions added in the future should they be required.

#### 2 Contents of the common definitions

As the vast majority of existing audio (and in the short-term future) is channel-based, most of the common definitions will be for channel-based audio. The initial set will concentrate on commonly used channel-based configurations. The other assumption used is that the track formats are pulse code modulation (PCM), so it does not include coded audio.

The ADM consists of several different elements used for defining audio. They either describe the content or the format. The set of common definitions is only concerned about the format elements as these can be defined without knowledge of the content of the audio. These elements are:

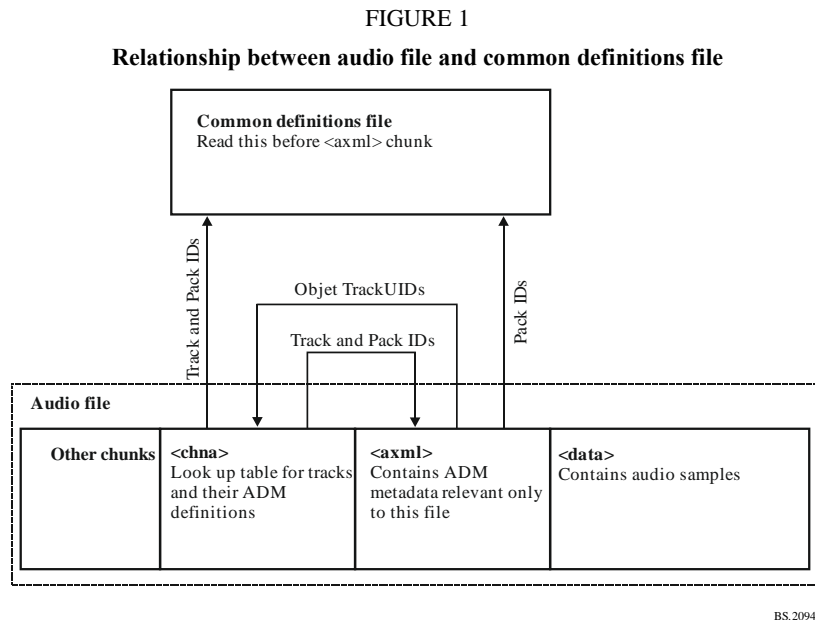
- audioTrackFormat
- audioStreamFormat
- audioChannelFormat
- audioBlockFormat
- audioPackFormat

Apart from audioPackFormat the elements are very closely tied together with one of each used for each channel definition. However, it does not mean that all four of these elements are required to be used at all times. It is perfectly acceptable to use a common audioChannelFormat/ audioBlockFormat definition with custom-made audioTrackFormat and audioStreamFormat definitions.

#### 3 Common definitions usage

The common definitions exist as an extensible markup language (XML) file which can be either stored locally with the application that is handling the audio files, or referred to remotely. It is not intended to be carried in the audio file itself, as one of the intentions of it is to reduce the amount of metadata required to be carried in audio files.

Any code that reads audio files that contain ADM-defined audio (so BWF, BW64, RF64 typically) should always aim to read the common definitions first before reading the ADM metadata stored within the audio file itself. The relationship between the audio file and the common definitions file is shown in Fig. 1.



The <chna> chunk contains an ID reference to both an audioTrackFormat and an audioPackFormat definition for each track in the file. These references should be looked up in the common definitions file first to see whether that contains the IDs, and if not then the audio file's <axml> chunk should be referred to. When inspecting the content-related ADM metadata in the <axml> chunk, in particular the audioObject elements, it may have references to IDs that exist in the common definitions file, most probably audioPackFormat IDs.

## 4 Set of common definitions

The set of common definitions consists of commonly used channel-based configurations, some of which are recognised standards and some are common proprietary configurations. The definitions consist of a set of audioChannelFormat definitions for channels associated with many different speaker locations, including all those in Recommendation ITU-R BS.2051. Each of these channel definitions has an associated audioStreamFormat and audioTrackFormat definition for PCM audio signals to cover the most typical use case. The set of audioPackFormat definitions for the various speaker combinations use only channels from this common set.

The audioChannelFormat and the audioPackFormat IDs follow this format:

- audioChannelFormatID: AC\_yyyy0xxx
- audioPackFormatID: AP\_yyyy0xxx

where the first four hexadecimal digits (yyyy) indicate what the type of audio is. If this value is set to 0001 then the type is 'DirectSpeakers', if it is 0002 then it is 'Matrix', 0003 for 'Objects', 0004 for 'HOA' and 0005 for 'Binaural'. The final four digits (0xxxx) have values below 1000, so belong to the set of common definitions as listed here.

### 4.1 Common definitions for the 'DirectSpeakers' audio type

#### 4.1.1 Common audioChannelFormats for 'DirectSpeakers'

TABLE 1  
AudioChannelFormat definitions for 'DirectSpeakers'

audioChannelFormatID	audioChannelFormatName	Azimuth	Elevation	speakerLabel
AC_00010001	FrontLeft	30	0	M+030
AC_00010002	FrontRight	-30	0	M-030
AC_00010003	FrontCentre	0	0	M+000
AC_00010004*	LowFrequencyEffects	0	-30	LFE
AC_00010005	SurroundLeft	110	0	M+110
AC_00010006	SurroundRight	-110	0	M-110
AC_00010007	FrontLeftOfCentre	22	0	M+022
AC_00010008	FrontRightOfCentre	-22	0	M-022
AC_00010009	BackCentre	180	0	M+180
AC_0001000a	SideLeft	90	0	M+090
AC_0001000b	SideRight	-90	0	M-090
AC_0001000c	TopCentre	0	90	T+000
AC_0001000d	TopFrontLeft	30	30	U+030
AC_0001000e	TopFrontCentre	0	30	U+000
AC_0001000f	TopFrontRight	-30	30	U-030
AC_00010010	TopSurroundLeft	110	30	U+110
AC_00010011	TopBackCentre	180	30	U+180
AC_00010012	TopSurroundRight	-110	30	U-110
AC_00010013	TopSideLeft	90	30	U+090
AC_00010014	TopSideRight	-90	30	U-090
AC_00010015	BottomFrontCentre	0	-30	B+000
AC_00010016	BottomFrontLeftMid	45	-30	B+045
AC_00010017	BottomFrontRightMid	-45	-30	B-045
AC_00010018	FrontLeftWide	60	0	M+060
AC_00010019	FrontRightWide	-60	0	M-060
AC_0001001a	BackLeftMidDiffuse	135	0	M+135_Diff
AC_0001001b	BackRightMidDiffuse	-135	0	M-135_Diff
AC_0001001c	BackLeftMid	135	0	M+135
AC_0001001d	BackRightMid	-135	0	M-135
AC_0001001e	TopBackLeftMid	135	30	U+135
AC_0001001f	TopBackRightMid	-135	30	U-135
AC_00010020*	LowFrequencyEffectsL	45	-30	LFE1
AC_00010021*	LowFrequencyEffectsR	-45	-30	LFE2
AC_00010022	TopFrontLeftMid	45	30	U+045
AC_00010023	TopFrontRightMid	-45	30	U-045

TABLE 1 (end)

audioChannelFormatID	audioChannelFormatName	Azimuth	Elevation	speakerLabel
AC_00010024	FrontLeftScreen	Left screen edge (or 25 if unknown)	0	M+SC
AC_00010025	FrontRightScreen	Right screen edge (or -25 if unknown)	0	M-SC
AC_00010026	FrontLeftMid	45	0	M+045
AC_00010027	FrontRightMid	-45	0	M-045
AC_00010028	UpperTopBackCentre	180	45	UH+180

\*These channels also feature a low pass frequency cut-off of 120 Hz.

Each channel definition is listed in Table 1, where the audioChannelFormatID, audioChannelFormatName and speakerLabel elements are listed. The azimuth and elevation columns represent the position that would be specified within the position sub-element (the distance is 1.0 for all these channel definitions). The XML below shows how the first entry in this table is represented in XML.

```
<audioChannelFormat audioChannelFormatID="AC_00010001" audioChannelFormatName="FrontLeft"
typeLabel="0001" typeDefinition="DirectSpeakers">
  <audioBlockFormat audioBlockFormatID="AC_00010001_00000001">
    <speakerLabel>urn:itu:bs:2051:0:speaker:M+030</speakerLabel>
    <position coordinate="azimuth">30.0</position>
    <position coordinate="elevation">0.0</position>
    <position coordinate="distance">1.0</position>
  </audioBlockFormat>
</audioChannelFormat>
```

#### 4.1.2 Common audioStreamFormats and audioTrackFormats for 'DirectSpeakers'

The common format type for audioStreamFormat and audioTrackFormat is 'PCM'.

As previously mentioned, the audioStreamFormat and audioTrackFormat, which relate to each audioChannelFormat definition use the same ID prefixes and the same names with 'PCM\_' appended, such as 'PCM\_FrontLeft'. The XML code below shows both the audioStreamFormat and audioTrackFormat definition for the first entry in the Table.

```
<audioStreamFormat audioStreamFormatID="AS_00010001" audioStreamFormatName="PCM_FrontLeft"
formatLabel="0001" formatDefinition="PCM">
  <audioChannelFormatIDRef>AC_00010001</audioChannelFormatIDRef>
  <audioTrackFormatIDRef>AT_00010001_01</audioTrackFormatIDRef>
</audioStreamFormat>

<audioTrackFormat audioTrackFormatID="AT_00010001_01" audioTrackFormatName="PCM_FrontLeft"
formatLabel="0001" formatDefinition="PCM">
  <audioStreamFormatIDRef>AS_00010001</audioStreamFormatIDRef>
</audioTrackFormat>
```

#### 4.1.3 Common audioPackFormats for 'DirectSpeakers'

The audioPackFormat definitions cover a range of speaker configurations. Table 2 shows the set of configurations that have been defined. The ones that are in Recommendation ITU-R BS.2051 are indicated. The last column gives the references to each channel the pack consists of. Instead of giving the whole ID (e.g. AP\_00010001), only the last two digits are listed for clarity; so they would be AP\_000100xx where xx is the digits listed to give the full audioPackFormatIDRef.

The audioPackFormat names have been given both a traditional name and the name formatted in the style of Recommendation ITU-R BS.2051 (U+M+L) separated by an underscore. Spaces are not used in the names as they can cause problems.

TABLE 2  
AudioPackFormat definitions

<b>audioPackFormatID</b> <b>audioPackFormatName</b> <i>Recommendation derived from</i>	<b>audioChannelIDRef</b>	<b>audioChannelName</b>	<b>Channel name in Recommendation</b>	<b>speakerLabel</b>
<b>AP_00010001</b> mono_(0+1+0) BS.775	AC_00010003	FrontCentre	Mono	M+000
<b>AP_00010002</b> stereo_(0+2+0) BS.775, BS.2051 (A)	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
<b>AP_0001000a</b> 3.0_(0+3+0) BS.775	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010003	FrontCentre	Centre	M+000
<b>AP_0001000b</b> 4.0_(0+4+0) N/A	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010003	FrontCentre	Centre	M+000
	AC_00010009	BackCentre	Mono Surround	M+180
<b>AP_0001000c</b> 5.0_(0+5+0) BS.775	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010003	FrontCentre	Centre	M+000
	AC_00010005	SurroundLeft	Left Surround	M+110
	AC_00010006	SurroundRight	Right Surround	M-110
<b>AP_00010003</b> 5.1_(0+5+0) BS.775, BS.2051 (B)	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010003	FrontCentre	Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE
	AC_00010005	SurroundLeft	Left Surround	M+110
	AC_00010006	SurroundRight	Right Surround	M-110
<b>AP_0001000d</b> 6.1_(0+6+0) N/A	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010003	FrontCentre	Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE



TABLE 2 (continued)

<b>audioPackFormatID</b> <b>audioPackFormatName</b> <i>Recommendation derived from</i>	<b>audioChannelIDRef</b>	<b>audioChannelName</b>	<b>Channel name in Recommendation</b>	<b>speakerLabel</b>
	AC_00010005	SurroundLeft	Left Surround	M+110
	AC_00010006	SurroundRight	Right Surround	M-110
	AC_00010009	BackCentre	Center Surround	M+180
<b>AP_0001000e</b> 7.1_front_(0+7+0) N/A	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010003	FrontCentre	Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE
	AC_00010005	SurroundLeft	Left Surround	M+110
	AC_00010006	SurroundRight	Right Surround	M-110
	AC_00010026	FrontLeftMid	Left Wide	M+045
	AC_00010027	FrontRightMid	Right Wide	M-045
<b>AP_0001000f</b> 7.1_back_(0+7+0) N/A	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010003	FrontCentre	Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE
	AC_0001000a	SideLeft	Left Side Surround	M+090
	AC_0001000b	SideRight	Right Side Surround	M-090
	AC_0001001c	BackLeftMid	Left Rear Surround	M+135
	AC_0001001d	BackRightMid	Right Rear Surround	M-135
<b>AP_00010004</b> 7.1_top_(2+5+0) BS.2051 (C)	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010003	FrontCentre	Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE
	AC_00010005	SurroundLeft	Left Surround	M+110
	AC_00010006	SurroundRight	Right Surround	M-110
	AC_0001000d	TopFrontLeft	Left Height	U+030
	AC_0001000f	TopFrontRight	Right Height	U-030
<b>AP_00010012</b> 7.1side_5.1+sc_(0+7+0) N/A	AC_00010001	FrontLeft	Front Left	M+030
	AC_00010002	FrontRight	Front Right	M-030
	AC_00010003	FrontCentre	Front Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE
	AC_00010005	SurroundLeft	Left Surround	M+110
	AC_00010006	SurroundRight	Right Surround	M-110
	AC_00010024	FrontLeftScreen	Front Left Screen	M+SC
	AC_00010025	FrontRightScreen	Front Right Screen	M-SC

TABLE 2 (continued)

<b>audioPackFormatID</b> <b>audioPackFormatName</b> <i>Recommendation derived from</i>	<b>audioChannelIDRef</b>	<b>audioChannelName</b>	<b>Channel name in Recommendation</b>	<b>speakerLabel</b>
<b>AP_00010013</b> 7.1topside_5.1.2_(2+5+0) N/A	AC_00010001	FrontLeft	Front Left	M+030
	AC_00010002	FrontRight	Front Right	M-030
	AC_00010003	FrontCentre	Front Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE
	AC_00010005	SurroundLeft	Left Surround	M+110
	AC_00010006	SurroundRight	Right Surround	M-110
	AC_00010013	TopSideLeft	Top Side Left	U+090
	AC_00010014	TopSideRight	Top Side Right	U-090
<b>AP_00010014</b> 9.1screen_5.1.2+sc_(2+7 +0) N/A	AC_00010001	FrontLeft	Front Left	M+030
	AC_00010002	FrontRight	Front Right	M-030
	AC_00010003	FrontCentre	Front Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE
	AC_00010005	SurroundLeft	Left Surround	M+110
	AC_00010006	SurroundRight	Right Surround	M-110
	AC_00010013	TopSideLeft	Top Side Left	U+090
	AC_00010014	TopSideRight	Top Side Right	U-090
	AC_00010024	FrontLeftScreen	Front Left Screen	M+SC
	AC_00010025	FrontRightScreen	Front Right Screen	M-SC
<b>AP_00010016</b> 9.1_7.1.2_(2+7+0) N/A	AC_00010001	FrontLeft	Front Left	M+030
	AC_00010002	FrontRight	Front Right	M-030
	AC_00010003	FrontCentre	Front Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE
	AC_0001000a	SideLeft	Left Side Surround	M+090
	AC_0001000b	SideRight	Right Side Surround	M-090
	AC_0001001c	BackLeftMid	Back Left	M+135
	AC_0001001d	BackRightMid	Back Right	M-135
	AC_00010013	TopSideLeft	Top Side Left	U+090
	AC_00010014	TopSideRight	Top Side Right	U-090
<b>AP_00010005</b> 9.1_5.1.4_(4+5+0) BS.2051 (D)	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010003	FrontCentre	Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE
	AC_00010005	SurroundLeft	Left Surround	M+110
	AC_00010006	SurroundRight	Right Surround	M-110
	AC_0001000d	TopFrontLeft	Left Height	U+030
	AC_0001000f	TopFrontRight	Right Height	U-030
	AC_00010010	TopSurroundLeft	Left Height Surround	U+110
AC_00010012	TopSurroundRight	Right Height Surround	U-110	

TABLE 2 (continued)

<b>audioPackFormatID</b> <b>audioPackFormatName</b> <i>Recommendation derived from</i>	<b>audioChannelIDRef</b>	<b>audioChannelName</b>	<b>Channel name in Recommendation</b>	<b>speakerLabel</b>
<b>AP_00010006</b> 10.1_(4+5+1) BS.2051 (E)	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010003	FrontCentre	Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE
	AC_00010005	SurroundLeft	Left Surround	M+110
	AC_00010006	SurroundRight	Right Surround	M-110
	AC_0001000d	TopFrontLeft	Left Height	U+030
	AC_0001000f	TopFrontRight	Right Height	U-030
	AC_00010010	TopSurroundLeft	Left Height Surround	U+110
	AC_00010012	TopSurroundRight	Right Height Surround	U-110
	AC_00010015	BottomFrontCentre	Centre Bottom	B+000
<b>AP_00010007</b> 10.2_(3+7+0) BS.2051 (F)	AC_00010003	FrontCentre	Centre	M+000
	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010022	TopFrontLeftMid	Left Height	U+045
	AC_00010023	TopFrontRightMid	Right Height	U-045
	AC_0001000a	SideLeft	Left Side	M+090
	AC_0001000b	SideRight	Right Side	M-090
	AC_0001001c	BackLeftMid	Left Back	M+135
	AC_0001001d	BackRightMid	Right Back	M-135
	AC_00010028	UpperTopBackCentre	Centre Height	UH+180
	AC_00010020	LowFrequencyEffectsL	LowFrequencyEffects-1	LFE1
AC_00010021	LowFrequencyEffectsR	LowFrequencyEffects-2	LFE2	
<b>AP_00010015</b> 11.1_5.1.4+sc_(4+7+0) N/A	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010003	FrontCentre	Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE
	AC_00010005	SurroundLeft	Left Surround	M+110
	AC_00010006	SurroundRight	Right Surround	M-110
	AC_0001000d	TopFrontLeft	Top Front Left	U+030
	AC_0001000f	TopFrontRight	Top Front Right	U-030
	AC_00010010	TopSurroundLeft	Top Surround Left	U+110
	AC_00010012	TopSurroundRight	Top Surround Right	U-110
	AC_00010024	FrontLeftScreen	Front Left Screen	M+SC
	AC_00010025	FrontRightScreen	Front Right Screen	M-SC

TABLE 2 (continued)

<b>audioPackFormatID</b> <b>audioPackFormatName</b> <i>Recommendation derived from</i>	<b>audioChannelIDRef</b>	<b>audioChannelName</b>	<b>Channel name in Recommendation</b>	<b>speakerLabel</b>
<b>AP_00010017</b> 11.1_7.1.4_(4+7+0) N/A	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010003	FrontCentre	Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE
	AC_0001000a	SideLeft	Left Side Surround	M+090
	AC_0001000b	SideRight	Right Side Surround	M-090
	AC_0001001c	BackLeftMid	Left Back	M+135
	AC_0001001d	BackRightMid	Right Back	M-135
	AC_00010022	TopFrontLeftMid	Top Left Mid	U+045
	AC_00010023	TopFrontRightMid	Top Right Mid	U-045
	AC_00010010	TopSurroundLeft	Top Surround Left	U+110
	AC_00010012	TopSurroundRight	Top Surround Right	U-110
<b>AP_00010008</b> 13.1_(4+9+0) BS.2051 (G)	AC_00010003	FrontCentre	Centre	M+000
	AC_00010024	FrontLeftScreen	Left Screen	M+SC
	AC_00010025	FrontRightScreen	Right Screen	M-SC
	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_0001000a	SideLeft	Left Side Surround	M+090
	AC_0001000b	SideRight	Right Side Surround	M-090
	AC_0001001c	BackLeftMid	Left Rear Surround	M+135
	AC_0001001d	BackRightMid	Right Rear Surround	M-135
	AC_00010022	TopFrontLeftMid	Left Top Front	U+045
	AC_00010023	TopFrontRightMid	Right Top Front	U-045
	AC_00010010	TopSurroundLeft	Left Top Rear	U+110
	AC_00010012	TopSurroundRight	Right Top Rear	U-110
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE

TABLE 2 (continued)

audioPackFormatID audioPackFormatName <i>Recommendation derived from</i>	audioChannelIDRef	audioChannelName	Channel name in Recommendation	speakerLabel
<b>AP_00010009</b> 22.2_(9+10+3) BS.2051 (H)	AC_00010018	FrontLeftWide	Front Left	M+060
	AC_00010019	FrontRightWide	Front Right	M-060
	AC_00010003	FrontCentre	Front Centre	M+000
	AC_00010020	LowFrequencyEffectsL	LowFrequencyEffects-1	LFE1
	AC_0001001c	BackLeftMid	Back Left	M+135
	AC_0001001d	BackRightMid	Back Right	M-135
	AC_00010001	FrontLeft	Front Left Centre	M+030
	AC_00010002	FrontRight	Front Right Centre	M-030
	AC_00010009	BackCentre	Back Centre	M+180
	AC_00010021	LowFrequencyEffectsR	LowFrequencyEffects-2	LFE2
	AC_0001000a	SideLeft	Side Left	M+090
	AC_0001000b	SideRight	Side Right	M-090
	AC_00010022	TopFrontLeftMid	Top Front Left	U+045
	AC_00010023	TopFrontRightMid	Top Front Right	U-045
	AC_0001000e	TopFrontCentre	Top Front Centre	U+000
	AC_0001000c	TopCentre	Top Centre	T+000
	AC_0001001e	TopBackLeftMid	Top Back Left	U+135
	AC_0001001f	TopBackRightMid	Top Back Right	U-135
	AC_00010013	TopSideLeft	Top Side Left	U+090
	AC_00010014	TopSideRight	Top Side Right	U-090
	AC_00010011	TopBackCentre	Top Back Centre	U+180
	AC_00010015	BottomFrontCentre	Bottom Front Centre	B+000
	AC_00010016	BottomFrontLeftMid	Bottom Front Left	B+045
AC_00010017	BottomFrontRightMid	Bottom Front Right	B-045	
<b>AP_00010011</b> Auro-3D_(9+9+0) N/A	AC_00010001	FrontLeft	Left	M+030
	AC_00010002	FrontRight	Right	M-030
	AC_00010003	FrontCentre	Centre	M+000
	AC_00010004	LowFrequencyEffects	Low Frequency Effects	LFE
	AC_00010005	SurroundLeft	Left Surround	M+110
	AC_00010006	SurroundRight	Right Surround	M-110
	AC_0001000a	SideLeft	Left Side	M+090
	AC_0001000b	SideRight	Right Side	M-090
	AC_0001001a	BackLeftMidDiffuse	Left Rear Surround	M+135_Diff
	AC_0001001b	BackRightMidDiffuse	Right Rear Surround	M-135_Diff
	AC_0001000d	TopFrontLeft	Height Left	U+030
	AC_0001000f	TopFrontRight	Height Right	U-030

TABLE 2 (end)

<b>audioPackFormatID</b> <b>audioPackFormatName</b> <i>Recommendation derived from</i>	<b>audioChannelIDRef</b>	<b>audioChannelName</b>	<b>Channel name in Recommendation</b>	<b>speakerLabel</b>
	AC_0001000e	TopFrontCentre	Height Centre	U+000
	AC_00010010	TopSurroundLeft	Height Left Surround	U+110
	AC_00010012	TopSurroundRight	Height Right Surround	U-110
	AC_00010013	TopSideLeft	Height Left Side	U+090
	AC_00010014	TopSideRight	Height Right Side	U-090
	AC_0001001e	TopBackLeftMid	Height Left Rear Surround	U+135
	AC_0001001f	TopBackRightMid	Height Right Rear Surround	U-135

To show how an audioPackDefinition is represented in XML the following code shows the stereo pack definition.

```
<audioPackFormat audioPackFormatID="AP_00010002"
audioPackFormatName="urn:itu:bs:2051:0:pack:stereo_(0+2+0)" typeLabel="0001"
typeDefinition="DirectSpeakers">
  <audioChannelFormatIDRef>AC_00010001</audioChannelFormatIDRef>
  <audioChannelFormatIDRef>AC_00010002</audioChannelFormatIDRef>
</audioPackFormat>
```

#### 4.2 Common definitions for the ‘Matrix’ audio type

Currently, there are no common definitions for the ‘Matrix’ audio type. However, in future revisions relevant information may be added to this section for common matrix configurations used.

#### 4.3 Common definitions for the ‘Objects’ audio type

Currently, there are no common definitions for the ‘Objects’ audio type. However, in future revisions relevant information may be added to this section.

#### 4.4 Common definitions for the ‘HOA’ audio type

Currently, there are no common definitions for the ‘HOA’ audio type. However, in future revisions relevant information may be added to this section.

#### 4.5 Common definitions for the ‘Binaural’ audio type

Currently, there are no common definitions for the ‘Binaural’ audio type. However, in future revisions relevant information may be added to this section.

##### 4.5.1 Common audioChannelFormats for ‘Binaural’

TABLE 3

#### AudioChannelFormat definitions for ‘Binural’

<b>audioChannelFormatID</b>	<b>audioChannelFormatName</b>
AC_00050001	LeftEar
AC_00050002	RightEar

Each channel definition is listed in Table 1, where the audioChannelFormatID, and audioChannelFormatName elements are listed. The XML below shows how the first entry in this table is represented in XML.

```
<audioChannelFormat audioChannelFormatID="AC_00050001" audioChannelFormatName="LeftEar"
typeLabel="0005" typeDefinition="DirectSpeakers">
  <audioBlockFormat audioBlockFormatID="AC_00050001_00000001">
    </audioBlockFormat>
  </audioChannelFormat>
```

**4.5.2 Common audioStreamFormats and audioTrackFormats for ‘Binaural’**

The common format type for audioStreamFormat and audioTrackFormat is ‘PCM’.

As previously mentioned, the audioStreamFormat and audioTrackFormat, which relate to each audioChannelFormat definition use the same ID prefixes and the same names with ‘PCM\_’ appended, such as ‘PCM\_LeftEar’. The XML code below shows both the audioStreamFormat and audioTrackFormat definition for the first entry in the table.

```
<audioStreamFormat audioStreamFormatID="AS_00050001" audioStreamFormatName="PCM_LeftEar"
formatLabel="0001" formatDefinition="PCM">
  <audioChannelFormatIDRef>AC_00050001</audioChannelFormatIDRef>
  <audioTrackFormatIDRef>AT_00050001_01</audioTrackFormatIDRef>
</audioStreamFormat>

<audioTrackFormat audioTrackFormatID="AT_00050001_01" audioTrackFormatName="PCM_LeftEar"
formatLabel="0001" formatDefinition="PCM">
  <audioStreamFormatIDRef>AS_00050001</audioStreamFormatIDRef>
</audioTrackFormat>
```

**4.5.3 Common audioPackFormats for ‘Binaural’**

The audioPackFormat definition covers a single configuration. Table 2 shows the configuration that has been defined. The last column gives the references to each channel the pack consists of. Instead of giving the whole ID (e.g. AP\_00010001), only the last two digits are listed for clarity; so they would be AP\_000100xx where xx is the digits listed to give the full audioPackFormatIDRef.

TABLE 4  
AudioPackFormat definitions

audioPackFormatID audioPackFormatName	audioChannelIDRef	audioChannelName
<b>AP_00050001</b> Binaural	AC_00050001 AC_00050002	LeftEar RightEar

To show how an audioPackDefinition is represented in XML the following code shows the binaural pack definition.

```
<audioPackFormat audioPackFormatID="AP_00050001" audioPackFormatName="Binaural" typeLabel="0001"
typeDefinition="DirectSpeakers">
  <audioChannelFormatIDRef>AC_00050001</audioChannelFormatIDRef>
  <audioChannelFormatIDRef>AC_00050002</audioChannelFormatIDRef>
</audioPackFormat>
```

**4.6 Using URIs**

As the set of common definitions may increase in the future, it helps to have a method of provenance for particular elements. In the channel definitions the speakerLabel elements correspond to those used

in Recommendation ITU-R BS.2051, which use the L+aaa style of naming. To clarify which common the label corresponds to it prefixed with a URI to reference the common used. This method was suggested in ITU-R contribution 6B/282 (“Comment On Audio-Related Metadata: ADM (Audio Definition Model) And MDA (Multi-Dimensional Audio)”).

The two places that use URIs are the speakerLabel element (within audioBlockFormat) and the audioPackFormatName attribute (part of audioPackFormat). For Recommendation ITU-R BS.2051 the URI prefix is given as: *urn:itu:bs:2051:0*. Examples of code using the URIs are shown below:

```
<speakerLabel>urn:itu:bs:2051:0:speaker:M+030</speakerLabel>
<audioPackFormat audioPackFormatID="AP_00010002"
audioPackFormatName="urn:itu:bs:2051:0:pack:stereo_(0+2+0)" typeLabel="0001"
typeDefinition="DirectSpeakers">
```

After each *urn:itu:bs:2051:0* prefix follows a string to classify what is being named (so either *speaker* or *pack* in this case), and then this is followed by the actual name.

## 5 Attachments

This file is a Microsoft Excel spreadsheet containing both the channel definitions and pack definitions:



common\_adm\_v6.xls

The following XML contains the Common Definitions using the Recommendation ITU-R BS.2076 model. It has been automatically generated from the spreadsheet. To use, just cut and paste into a plain ASCII text file (Word does not allow XML files to be attached unfortunately).

```
<?xml version='1.0' encoding='utf-8'?>
<ituADM xmlns="urn:metadata-schema:adm">
  <coreMetadata>
    <format>
      <audioFormatExtended>
        <audioPackFormat audioPackFormatID="AP_00010001" audioPackFormatName="urn:itu:bs:775:3:pack:mono_(0+1+0)" typeLabel="0001"
typeDefinition="DirectSpeakers">
          <audioChannelFormatIDRef>AC_00010003</audioChannelFormatIDRef>
        </audioPackFormat>
        <audioPackFormat audioPackFormatID="AP_00010002" audioPackFormatName="urn:itu:bs:2051:0:pack:stereo_(0+2+0)"
typeLabel="0001" typeDefinition="DirectSpeakers">
          <audioChannelFormatIDRef>AC_00010001</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010002</audioChannelFormatIDRef>
        </audioPackFormat>
        <audioPackFormat audioPackFormatID="AP_0001000a" audioPackFormatName="urn:itu:bs:775:3:pack:3.0_(0+3+0)" typeLabel="0001"
typeDefinition="DirectSpeakers">
          <audioChannelFormatIDRef>AC_00010001</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010002</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010003</audioChannelFormatIDRef>
        </audioPackFormat>
        <audioPackFormat audioPackFormatID="AP_0001000b" audioPackFormatName="urn:itu:bs:775:3:pack:4.0_(0+4+0)" typeLabel="0001"
typeDefinition="DirectSpeakers">
          <audioChannelFormatIDRef>AC_00010001</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010002</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010003</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010009</audioChannelFormatIDRef>
        </audioPackFormat>
        <audioPackFormat audioPackFormatID="AP_0001000c" audioPackFormatName="urn:itu:bs:2051:0:pack:5.0_(0+5+0)" typeLabel="0001"
typeDefinition="DirectSpeakers">
          <audioChannelFormatIDRef>AC_00010001</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010002</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010003</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010005</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010006</audioChannelFormatIDRef>
        </audioPackFormat>
        <audioPackFormat audioPackFormatID="AP_00010003" audioPackFormatName="urn:itu:bs:2051:0:pack:5.1_(0+5+0)" typeLabel="0001"
typeDefinition="DirectSpeakers">
          <audioChannelFormatIDRef>AC_00010001</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010002</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010003</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010004</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010005</audioChannelFormatIDRef>
          <audioChannelFormatIDRef>AC_00010006</audioChannelFormatIDRef>
        </audioPackFormat>
        <audioPackFormat audioPackFormatID="AP_0001000d" audioPackFormatName="6.1_(0+6+0)" typeLabel="0001"
typeDefinition="DirectSpeakers">
```













```

</audioChannelFormat>
<audioChannelFormat audioChannelFormatID="AC_00010021" audioChannelFormatName="LowFrequencyEffectsR" typeLabel="0001"
typeDefinition="DirectSpeakers">
  <frequency typeDefinition="lowPass">120.0</frequency>
  <audioBlockFormat audioBlockFormatID="AC_00010021_00000001">
    <speakerLabel>urn:itu:bs:2051:0:speaker:LFR</speakerLabel>
    <position coordinate="azimuth">-45.0</position>
    <position coordinate="elevation">-30.0</position>
    <position coordinate="distance">1.0</position>
  </audioBlockFormat>
</audioChannelFormat>
<audioChannelFormat audioChannelFormatID="AC_00010022" audioChannelFormatName="TopFrontLeftMid" typeLabel="0001"
typeDefinition="DirectSpeakers">
  <audioBlockFormat audioBlockFormatID="AC_00010022_00000001">
    <speakerLabel>urn:itu:bs:2051:0:speaker:U+045</speakerLabel>
    <position coordinate="azimuth">45.0</position>
    <position coordinate="elevation">30.0</position>
    <position coordinate="distance">1.0</position>
  </audioBlockFormat>
</audioChannelFormat>
<audioChannelFormat audioChannelFormatID="AC_00010023" audioChannelFormatName="TopFrontRightMid" typeLabel="0001"
typeDefinition="DirectSpeakers">
  <audioBlockFormat audioBlockFormatID="AC_00010023_00000001">
    <speakerLabel>urn:itu:bs:2051:0:speaker:U-045</speakerLabel>
    <position coordinate="azimuth">-45.0</position>
    <position coordinate="elevation">30.0</position>
    <position coordinate="distance">1.0</position>
  </audioBlockFormat>
</audioChannelFormat>
<audioChannelFormat audioChannelFormatID="AC_00010024" audioChannelFormatName="FrontLeftScreen" typeLabel="0001"
typeDefinition="DirectSpeakers">
  <audioBlockFormat audioBlockFormatID="AC_00010024_00000001">
    <speakerLabel>urn:itu:bs:2051:0:speaker:M+SC</speakerLabel>
    <position coordinate="azimuth" screenEdgeLock="left">25.0</position>
    <position coordinate="elevation">0.0</position>
    <position coordinate="distance">1.0</position>
  </audioBlockFormat>
</audioChannelFormat>
<audioChannelFormat audioChannelFormatID="AC_00010025" audioChannelFormatName="FrontRightScreen" typeLabel="0001"
typeDefinition="DirectSpeakers">
  <audioBlockFormat audioBlockFormatID="AC_00010025_00000001">
    <speakerLabel>urn:itu:bs:2051:0:speaker:M-SC</speakerLabel>
    <position coordinate="azimuth" screenEdgeLock="right">-25.0</position>
    <position coordinate="elevation">0.0</position>
    <position coordinate="distance">1.0</position>
  </audioBlockFormat>
</audioChannelFormat>
<audioChannelFormat audioChannelFormatID="AC_00010026" audioChannelFormatName="FrontLeftMid" typeLabel="0001"
typeDefinition="DirectSpeakers">
  <audioBlockFormat audioBlockFormatID="AC_00010026_00000001">
    <speakerLabel>urn:itu:bs:2051:0:speaker:M+045</speakerLabel>
    <position coordinate="azimuth">45.0</position>
    <position coordinate="elevation">0.0</position>
    <position coordinate="distance">1.0</position>
  </audioBlockFormat>
</audioChannelFormat>
<audioChannelFormat audioChannelFormatID="AC_00010027" audioChannelFormatName="FrontRightMid" typeLabel="0001"
typeDefinition="DirectSpeakers">
  <audioBlockFormat audioBlockFormatID="AC_00010027_00000001">
    <speakerLabel>urn:itu:bs:2051:0:speaker:M-045</speakerLabel>
    <position coordinate="azimuth">-45.0</position>
    <position coordinate="elevation">0.0</position>
    <position coordinate="distance">1.0</position>
  </audioBlockFormat>
</audioChannelFormat>
<audioChannelFormat audioChannelFormatID="AC_00010028" audioChannelFormatName="UpperTopBackCentre" typeLabel="0001"
typeDefinition="DirectSpeakers">
  <audioBlockFormat audioBlockFormatID="AC_00010028_00000001">
    <speakerLabel>urn:itu:bs:2051:0:speaker:UH+180</speakerLabel>
    <position coordinate="azimuth">180.0</position>
    <position coordinate="elevation">45.0</position>
    <position coordinate="distance">1.0</position>
  </audioBlockFormat>
</audioChannelFormat>
<audioChannelFormat audioChannelFormatID="AC_00050001" audioChannelFormatName="LeftEar" typeLabel="0005"
typeDefinition="Binaural">
  <audioBlockFormat audioBlockFormatID="AC_00050001_00000001">
  </audioBlockFormat>
</audioChannelFormat>
<audioChannelFormat audioChannelFormatID="AC_00050002" audioChannelFormatName="RightEar" typeLabel="0005"
typeDefinition="Binaural">
  <audioBlockFormat audioBlockFormatID="AC_00050002_00000001">
  </audioBlockFormat>
</audioChannelFormat>
<audioStreamFormat audioStreamFormatID="AS_00010001" audioStreamFormatName="PCM_FrontLeft" formatLabel="0001"
formatDefinition="PCM">
  <audioChannelFormatIDRef>AC_00010001</audioChannelFormatIDRef>
  <audioTrackFormatIDRef>AT_00010001_01</audioTrackFormatIDRef>
</audioStreamFormat>
<audioStreamFormat audioStreamFormatID="AS_00010002" audioStreamFormatName="PCM_FrontRight" formatLabel="0001"
formatDefinition="PCM">
  <audioChannelFormatIDRef>AC_00010002</audioChannelFormatIDRef>
  <audioTrackFormatIDRef>AT_00010002_01</audioTrackFormatIDRef>
</audioStreamFormat>
<audioStreamFormat audioStreamFormatID="AS_00010003" audioStreamFormatName="PCM_FrontCentre" formatLabel="0001"
formatDefinition="PCM">
  <audioChannelFormatIDRef>AC_00010003</audioChannelFormatIDRef>
  <audioTrackFormatIDRef>AT_00010003_01</audioTrackFormatIDRef>
</audioStreamFormat>
<audioStreamFormat audioStreamFormatID="AS_00010004" audioStreamFormatName="PCM_LowFrequencyEffects" formatLabel="0001"
formatDefinition="PCM">
  <audioChannelFormatIDRef>AC_00010004</audioChannelFormatIDRef>
  <audioTrackFormatIDRef>AT_00010004_01</audioTrackFormatIDRef>
</audioStreamFormat>

```









```

    <audioStreamFormatIDRef>AS_0001001f</audioStreamFormatIDRef>
  </audioTrackFormat>
  <audioTrackFormat audioTrackFormatID="AT_00010020_01" audioTrackFormatName="PCM_LowFrequencyEffectsL" formatLabel="0001"
formatDefinition="PCM">
    <audioStreamFormatIDRef>AS_00010020</audioStreamFormatIDRef>
  </audioTrackFormat>
  <audioTrackFormat audioTrackFormatID="AT_00010021_01" audioTrackFormatName="PCM_LowFrequencyEffectsR" formatLabel="0001"
formatDefinition="PCM">
    <audioStreamFormatIDRef>AS_00010021</audioStreamFormatIDRef>
  </audioTrackFormat>
  <audioTrackFormat audioTrackFormatID="AT_00010022_01" audioTrackFormatName="PCM_TopFrontLeftMid" formatLabel="0001"
formatDefinition="PCM">
    <audioStreamFormatIDRef>AS_00010022</audioStreamFormatIDRef>
  </audioTrackFormat>
  <audioTrackFormat audioTrackFormatID="AT_00010023_01" audioTrackFormatName="PCM_TopFrontRightMid" formatLabel="0001"
formatDefinition="PCM">
    <audioStreamFormatIDRef>AS_00010023</audioStreamFormatIDRef>
  </audioTrackFormat>
  <audioTrackFormat audioTrackFormatID="AT_00010024_01" audioTrackFormatName="PCM_FrontLeftScreen" formatLabel="0001"
formatDefinition="PCM">
    <audioStreamFormatIDRef>AS_00010024</audioStreamFormatIDRef>
  </audioTrackFormat>
  <audioTrackFormat audioTrackFormatID="AT_00010025_01" audioTrackFormatName="PCM_FrontRightScreen" formatLabel="0001"
formatDefinition="PCM">
    <audioStreamFormatIDRef>AS_00010025</audioStreamFormatIDRef>
  </audioTrackFormat>
  <audioTrackFormat audioTrackFormatID="AT_00010026_01" audioTrackFormatName="PCM_FrontLeftMid" formatLabel="0001"
formatDefinition="PCM">
    <audioStreamFormatIDRef>AS_00010026</audioStreamFormatIDRef>
  </audioTrackFormat>
  <audioTrackFormat audioTrackFormatID="AT_00010027_01" audioTrackFormatName="PCM_FrontRightMid" formatLabel="0001"
formatDefinition="PCM">
    <audioStreamFormatIDRef>AS_00010027</audioStreamFormatIDRef>
  </audioTrackFormat>
  <audioTrackFormat audioTrackFormatID="AT_00010028_01" audioTrackFormatName="PCM_UpperTopBackCentre" formatLabel="0001"
formatDefinition="PCM">
    <audioStreamFormatIDRef>AS_00010028</audioStreamFormatIDRef>
  </audioTrackFormat>
  <audioTrackFormat audioTrackFormatID="AT_00050001_01" audioTrackFormatName="PCM_LeftEar" formatLabel="0001"
formatDefinition="PCM">
    <audioStreamFormatIDRef>AS_00050001</audioStreamFormatIDRef>
  </audioTrackFormat>
  <audioTrackFormat audioTrackFormatID="AT_00050002_01" audioTrackFormatName="PCM_RightEar" formatLabel="0001"
formatDefinition="PCM">
    <audioStreamFormatIDRef>AS_00050002</audioStreamFormatIDRef>
  </audioTrackFormat>
  </audioFormatExtended>
</format>
</coreMetadata>
</ituADM>

```